① $\left[\frac{1}{4p} + \frac{2}{p} = 3\right]4p$

$1 + 8 = 12p$

$\frac{3}{4} = \frac{9}{12} = p$

$\{\frac{3}{4}\}$

② $\left[\frac{2}{t} + 6 = \frac{5}{2t}\right]2t$

$4 + 12t = 5$

$12t = 1$

$t = \frac{1}{12}$

$\{\frac{1}{12}\}$

③ $\frac{5}{2a+3} + \frac{1}{a-6} = 0$

$\frac{5}{2a+3} = \frac{-1}{a-6}$

$5a - 30 = -2a - 3$

$7a = 27$

$a = \frac{27}{7}$

$\{\frac{27}{7}\}$

④ $\frac{2}{x+1} = \frac{3}{5x+5}$

$10x + 10 = 3x + 3$

$7x = -7$

$x = -1$

ϕ

⑤ $\frac{3}{y-2} + \frac{1}{y+1} = \frac{1}{y^2-y-2}$

$\left[\frac{3}{y-2} + \frac{1}{y+1} = \frac{1}{(y-2)(y+1)}\right](y-2)(y+1)$

$3(y+1) + (y-2) = 1$

$3y + 3 + y - 2 = 1$

$4y + 1 = 1$

$4y = 0$

$y = 0$

$\{0\}$

⑥ $\frac{2}{p+3} - \frac{5}{p-1} = \frac{1}{3-2p-p^2}$

$3 - 2p - p^2$

$-p^2 - 2p + 3$

$-(p^2 + 2p - 3)$

$-(p+3)(p-1)$

$\left[\frac{2}{(p+3)} - \frac{5}{(p-1)} = \frac{1}{-(p+3)(p-1)}\right](p+3)(p-1)$

$2(p-1) - 5(p+3) = -1$

$2p - 2 - 5p - 15 = -1$

$-3p - 17 = -1$

$-3p = 16$

$p = -16/3$

$\{\frac{-16}{3}\}$

p156-157: 1-12 All, skip 6
p136: 1-6 (all)

Unit 7 Review

① $2m+7=3m+1$
$-m=-6$
$m=6$
$\{6\}$

② $4K-2(K-1)=12$
$4K-2K+2=12$
$2K+2=12$
$2K=10$
$K=5$ $\{5\}$

③ $5y-2(y+4)=3(2y+1)$
$5y-2y-8=6y+3$
$3y-8=6y+3$
$-3y=11$
$y=\frac{11}{3}$ $\{-\frac{11}{3}\}$

④ $9x-11(K+p)=x(a-1)$ for x
$9x-11K-11p=xa-x$
$10x-xa=11K+11p$
$x(10-a)=11K+11p$
$x=\frac{11K+11p}{10-a}$ $a\neq 10$

⑤ $A=\frac{24f}{B(p+1)}$ for f
$AB(p+1)=24f$
$\frac{AB(p+1)}{24}=f$
No Restrictions

⑦

	rate (miles/hr)	time (hours)	distance
to school	x	$\frac{1}{3}$ hour	$\frac{1}{3}x$
from library	$x-8$	$\frac{1}{2}$ hour	$\frac{1}{2}(x-8)$

This problem hinges on the fact that the dist. to and from work is the same. We must express each of those distances in terms of the rates. Then equate those expressions

let x = her rate travelling to school

distance to library = distance from library

$6\left[\frac{1}{3}x=\frac{1}{2}(x-8)\right]$

$2x=3(x-8)$
$2x=3x-24$
$24=x$

She travels 24 mph. Substitute this into either expression for the distance and you know her distance from the library.

"To" $\frac{1}{3}x=\frac{1}{3}(24)=8$ miles

"From" $\frac{1}{2}(x-8)=\frac{1}{2}(24-8)=\frac{1}{2}(16)=8$ miles

She lives 8 miles from the library.

Unit 7 Review Continued

⑧

	Volume (L) of Base	% Alcohol	Volum of Alcohol (L)
START	12	.10	1.2
ADD	x	1.0	x
Finish	$12+x$	.30	$1.2+x$ $.30(12+x)$

let x = volume (L) of pure alcohol added

$.30(12+x) = 1.2 + 1.0x$

$3(12+x) = 12 + 10x$

$36 + 3x = 12 + 10x$

$\frac{24}{7} = \frac{7x}{7}$

$\frac{24}{7} = x$

The chemist must add $3\frac{3}{7}$ liters of pure alcohol.

This problem hinges ② on the fact that there are 2 ways to express the finished volume of alcohol, as seen in the lower right hand box.

$1.2+x$ is the sum of the volumes of alcohol

$.30(12+x)$ is the product of the % alcohol and the volume of the base.

---

⑨ let w = weekly gross pay ($)

Take home = Gross pay − deductions

$925 = w - .26w$

$925 = .74w$

$1250 = w$

Her weekly pay before deductions is $1250

⑩ Assume simple interest.

let x = amt borrowed @ 11.5%

$90000 - x$ = amt borrowed @ 12%

amt of int @ 11.5% + amt of int @ 12% = Total interest

$.115x + .12(90000 - x) = 10525$

$115x + 120(90000 - x) = 10525000$

$115x + 10800000 - 120x = 10525000$

$-5x = -275{,}000$

$x = 55{,}000$

She borrowed $55,000 @ 11.5%

She borrowed $35,000 @ 12%

(11)

	rate (mph)	× time (hours)	= distance (miles)
up	r	1.2	$1.2r$
Down	$r+5$	.9	$.9(r+5)$

The upriver trip has the same distance as the downriver trip. If we express the upriver rate as r, then we can express the downriver rate as $r+5$ b/c the downriver rate is faster. Express the distance in 2 different ways using these different rates and equate the distances.

let r = rate upriver.

upriver distance = downriver distance

$1.2r = .9(r+5)$

$12r = 9(r+5)$

$12r = 9r + 45$

$3r = 45$

$r = 15$

The boat travels upriver at a rate of 15 mph

---

(12)

	Rate of Job (part/hr)	Time (hours)	Part of Job completed
Plant I	$\frac{1}{x}$	3	$\frac{3}{x}$
Plant II	$\frac{1}{2x}$	3	$\frac{3}{2x}$

The difficult part of this problem is expressing the rates. In one hour, a plant will release 1 part of what they would release over the total time. Since we don't know that time, the rate is expressed as $\frac{1}{x}$, with x being the amt of time needed to complete the "job"

let x = amt of time plant I needs to release a "certain" amount" of toxic waste.

Amt released by I + Amt released by II = whole

$$\left[\frac{3}{x} + \frac{3}{2x} = 1\right]2x$$

$6 + 3 = 2x$

$9 = 2x$

$\frac{9}{2} = x$

Since x is the amt of hours it takes Plant I, it takes Plant I 4.5 hours to finish and twice that, 9 hours, for plant II to release that amt.